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ABSTRACT

A system in which the function of the library is to acquire, store, and organize materials is proposed which separates the reference function into a group of subject specialists backed up by computerized information retrieval systems. This division of labor is caused by the scientific community's need for access to graphic and other specific (not necessarily book) materials. The Canadian National Research Council has been instructed to develop a Scientific and Technical Information services system (STI). The present plan for a national network is to link existing sources of STI services (libraries, document centers, data banks, etc.) into a referral service network which can direct users to the appropriate source or service. (LS)

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ADDRESS BY

L.G. Côté

Scientific and Technical Information Services

National Research Council of Canada

on

"DATA BASES AND LIBRARIES"

to

EDUCOM FALL CONFERENCE

(North American Perspective)

Toronto, October 16, 1974

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"DATA BASES AND LIBRARIES"

I The Deductive or Presumptive Process

For the sake of distinguishing between the goals of purposeful system engineering and the goals of the baronial or territorial imperative of vested interests, I often argue that the need for a National Network of Scientific and Technical Information Services has been established either deductively or presumptively.

Usually, a considerable amount of orchestration will follow. The result is either cacophony, or harmony - opinion, or wise sound counsel. The latter we use, if we can discern it; the former we park on our opinion list and from time to time test, as best we can, by the scientific or system engineering method.

Now, I have been delighted-doubly. First, by your invitation to speak to you and second by a matter of presumption. During a telephone conversation with a member of your programme committee we agreed I should talk about networking. Specifically, about the job given to the National Research Council by the federal government to develop and implement a Canadian Network of Scientific and Technical Information Services. There was, I think, some agreement on a three sentence statement about this topic. There was, however, no discussion about the title. It was fortunate that I read the "preliminary conference programme", and discovered that the title was given as - "Data Bases and Libraries". The matter of presumption, of course, was that the topic of "a network of information services" required the imputative titling - "Data Bases and Libraries". I think that this deduction raises a fascinating confusion of ideas. Particularly, because the notion is again put forth that print or text, in any hard media, is the exclusive method of conveying or transferring information or knowledge.

II The Proposition

The development and implementation of a National Network of Scientific and Technical Information Services should be based on a

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model which is eccentric to libraries and not heliocentric.

Information is available broadly, in two ways:

1. As published material, "refereed" and "non-refereed", held largely but not exclusively in repositories such as libraries, archives and other document services.

2. From the knowledge and experience, ("know-how"), of scientists, engineers and affiliated practitioners who are also more conversant and more able than librarians to judge the applicability, the quality and relevance of the published material in their respective fields

Both of these potential resources must be mustered for the operation of a national network and the network model must embrace the latter resource to an extent where the model will not be heliocentric in respect to libraries.

III Data Bases and Libraries

a) Data Bases

Calvin N. Mooers of Rockford Research Institute Inc., in Cambridge expresses considerable aggrievement concerning the sad fate of a well-known neologisim for which he was the originator - "descriptor". He says that, "we were never able to save the new term from the uttermost semantic corruption - which is now its present state". Further, he says, "the latest fate of the term is that it has been taken over by that nonliterate horde of computer scientists who - not knowing that "descriptor" is not a long-established word listed in the dictionary - are using it promiscuously and erroneously in their prose descriptions of programming methods".

Would you agree that these terrible computer scientists, having conscience, have offered retribution by providing the

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neologism - "data base"? I am not aware that Calvin Mooers has dealt with this, but I do know that outside of the peers of the privy colleges of computer and information specialists - "data base" is a neologism which is abstruse and nearly inexplainable.

For the record, we usually use the following explanation: Data base is a computer term which is generally a synonym for file. A file can be a list of tabulated numerical data; an inventory or listing of the contents of a warehouse (the books and journals of a library - a catalogue); sets of indices of journal articles, sets of abstracts of journal articles; lists of books and articles about a particular subject - a bibliography; statistical data on energy consumption, numerical, geographical and chemical data of fresh water resources; construction or engineering information and data; an inventory of research projects in an institution and similarly on a national basis; an inventory of skills and "know-how" which support research projects, engineering projects or any other technical endeavor; one might even classify a library's collection of graphic material as a data base.

The factor about a data base which is important, is that the compilation of a data base requires the active participation of experts on the subject of the data base. Further, the on-going updating and operation of a data base information system requires the continuing participation of subject matter experts.

Because of this factor - it seems improbable or impractical for a library to extend its operations beyond certain classic boundaries. If this extension is attempted we have something quite different than a library.

b) Libraries

According to one definition, "A library is a collection of graphic materials (such as books, films, magazines, manuscripts, an

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phonograph records) designed for use". The extent of these varied graphic materials is limitless, yet librarians are expected to furnish promptly any publication or other record which a patron may desire. Not every demand can be met, but librarians undertake to meet as many requests as possible. This is done by bringing together the materials of most interest to the users of a library and by listing and arranging them in a fashion which will facilitate the rapid location of a particular work. The modern librarian also endeavors to furnish bits of information from materials in his collection, because library users ordinarily cannot do this for themselves. The duties of individual librarians differ in relation to many factors, such as the objectives, size and location of their institutions; but the work of all can be considered conveniently under the headings of acquisitions, processing (including cataloging and classification), circulation, and reference.

John Stuart Mill, an English philosopher and economist who died in 1873 said: "That so few now dare to be eccentric marks the chief danger of the time". That so few now dare to stick their necks out - now dare to advance an unpopular idea - now dare to express themselves openly, even when there is a possibility they will be ridiculed marks the chief danger of our time. If you prefer: a quotation which I heard from a man many years ago that sums it up. He said this: "Silence ain't always golden - sometimes it's just plain yellow".

So, let me tell you about an unpopular idea I have and give you a simple illustration.

The real work of the librarian and the library is one of materials management - that is, the gathering and storing of published information for ready access upon demand, <u>when identified by other means</u>. It is an essential foundation activity in the total information field, and should be done as effectively and efficiently as possible. But the sharp point of progress in the information field is in the hands

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of others - the information specialist, the computer and systems specialists and most of all the subject matter experts. Progress will only be slowed by insisting that this work remain under the control of libraries.

I think that the definition that I have given clearly supports this view. The main activities of a library are purchasing, inventory control, issue and receipt and cataloguing and classification. All of that is materials management. The one element that is an extension, is that of reference. The work of reference is made monumentally difficult not by the accretion of information but, rather by the accretion of graphic materials. It is now quite improbable that the management and operators of a library can ever get to achieve the intimate knowledge of the subject matter expert of the kind, quality and value of the information contained in their collections of graphic materials.

I have not the space nor the time to explore this in depth. However, one simple illustration may help illuminate this problem.

I have two catalogue records which I want to show you.

One is a library catalogue record made in accordance with current, modern bibliographic standards. The other is a catalogue record of a device that is stocked in one of the material warehouses of the National Research Council. (See appendices A and B). I would like you to look for one characteristic in each of these records. That is, how informative is each record? And, which record has sufficient information for you to make a precise and relevant selection of material for the purpose you have in mind? Incidentally, the science fiction book - " A Canticle for Leibowitz" is an allegory. It is entertaining, and will also give you a very unusual view of a library and librarians.

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With more and more published material becoming available each year on almost every subject, the provision of a mechanism for finding the specific information contents of each book, article, report, etc. is of paramount importance. The content analysis as performed by libraries in their cataloguing operations is relatively lacking in detail. Reference librarians are very adept at using the catalogue to the limit possible, but the limit remains none-the-less. The abstracting and indexing activities of the documentalists is much better as to specific detail, and when combined with the power of the computer to seek out unique combinations of terms, provides a very substantial improvement in the ability to identify rapidly and precisely, the fewest published items most likely to satisfy a given requirement. For good results, an information specialist who is familiar with the different approaches of various groups of documentalists which perform the abstracting and indexing for world-wide use, is required. Best of all is the specific recommendation of an information analysis centre or a subject matter expert, who, being thoroughly familiar with the literature and state of knowledge in his particular field, can enter into a discussion with the user to discern the real nature of his information need and level of comprehension and, if necessary, can assist the user in the interpretation of the published information, or provide the required information from his own personal experience.

Another consideration - the inventory of printed matter is ever expanding (probably the publishers should be faulted). No matter the size and tidiness of this hoard, (it is not far different from one's own attic collection of odds and ends), retrieval seldom provides solutions. Facts, (often trivia), are retrievable but are merely an input to the synergistic methods of problem analysis and solution.

Now, I think you should read one other thing besides the Canticle for Leibowitz. This is the June 1974 issue (Vol. 30, No. 2)

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of the Journal of Documentation. This issue contains a set of Essays to Robert A. Fairthorne. These essays can all be read in a few hours but more important the authors are among the privy council of peers of all facets of this business.

IV The Information Industry

I have included this sub-topic merely for matter of early-alerting or as an "aide-memoire". Three points are sufficient: copyright, author lending fees and the adoption of new technology for the publishing process.

The first two points will obviously have at least an economic repercussion on library operations and it is not improbable that systems such as lending and copying will be severely dislocated.

The last point may probably pose the greatest upset to the forward planning of library systems. It is not beyond reason that with the use of new automated techniques and very low cost storage methods, the publishers could move squarely into the library and information domain. Further, since this will be a "for profit" industry operation one might expect quality control and value analysis to a degree not yet achieved by libraries.

A final early alerting note is that the National Science Foundation of the United States has commissioned the production of a planning guide to be titled: "INNOVATION in the Dissemination of Scientific and Technical Information". (This will cover innovations applicable to Conventional Publishing.)

V Canada in the North American Perspective

Through a combined process of osmosis (principally from the U.S.A.) and overt Canadian activity and examination there is a

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range of strong pressures for Canada to develop a strong and emergent system of Scientific and Technical Information Services which are carefully matched to the demonstrable needs of all Canadians.

For the present, the current Canadian course is founded on the following watershed items:

1. The study and report by the Science Council of Canada -
   a) Science Council Special Study No. 8 (the Tyas Study).
   b) Science Council Report No. 6, (the Katz Report).

2. The Cabinet instruction of December 1969 to the National Research Council to develop, in concert with existing information organizations, a national STI system; and that this was to be done under the general direction of the Advisory Board.

3. The National Library Act of 1969.

4. The telecommunication studies of the Federal Department of Communications, particularly the Von Bayer study of computer-communications, titled "Branching Out".

The National Research Council formed the national Advisory Board on Scientific and Technical Information in 1970. It was provided with a full time Executive Secretariat and a Network Planning and Development Staff. Simultaneously, the National Research Council's National Science Library and Technical Information Service undertook a programme, jointly with the National Research Council Computation Centre, to develop a range of computer based information services. These services are operated as national services from coast to coast.

The National Library, during this period, set about to develop numerous standards, processes and procedures for the federal

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library system, many of which we hope other Canadian libraries will follow. Plans for extensive use of computers to provide library support and housekeeping services have been developed. The first phases of these standards and plans have either been implemented or are just being implemented.

Additionally, a large number of activities to provide new information services are underway in the universities, in various departments of federal and provincial governments and in the Canadian information industry (particularly by the publishers).

Some people view this unorchestrated range of activities with dismay. Personally, I believe that these individual initiatives are necessary and fruitful. First, most of these activities (not all) are undertaken to meet quite well specified and pronounced needs. Therefore, in aggregate they form a firm base for what might be the eventual total Canadian system. Second, the work that is done in this way creates a very much needed increase in depth and variety of Canadian expertise and experts.

The latest development was the inauguration of the Canada Institute for Scientific and Technical Information on 16 October 1974. The Institute has been provided with a new 14.8 million dollar building which is located within the NRC laboratory complex in Ottawa.

This new National Research Council Institute is being founded on the combined resources of two major NRC information services, the National Science Library and the Technical Information Service.

The Institute will continue to provide all of the previous services and:

a) will undertake and assess R & D for the development of new scientific and technical information (STI) systems and services.

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b) will provide additional national STI Services which should be operated on a centralized basis because of cost effectiveness or other reasons,

c) will provide an organization capable of linking the Canadian Network of STI Services to foreign and international STI Networks

There is no question that our work of building a national network of STI Services is still at the organizational and preparatory stage. To date, we have determined that it is much more prudent to encourage the growth of a variety of relatively small independent systems or networks rather than attempt to establish a working, fully integrated network or system.

Also, national priorities are in a state of rapid evolution. It seems that the all-consuming drive for new knowledge to feed research and development and high technology may be waning. The containment of world population and the issues of urbanization, the quality of life, the environment, the world food bank seem to be supplanting the need for ever-increasing technological advances. This environment of shifting sands causes many difficulties in setting goals and objectives for information systems design.

The current planning challenge is that the existing information resources and services required for the Canadian network are owned and managed by a variety of jurisdictions and are not easily shared, nor even known, beyond jurisdictional and institutional boundaries. Further, these resources are clustered in only a few geographical areas and have an extreme heterogeneity of economic, technical and operations practices.

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Although we are faced with these realities, a plan has been proposed and accepted in principle for the development of a network of information referral service offices. It is proposed that existing sources of STI Services such as libraries, document centres, data banks and centres of expertise in the federal, provincial and private sectors will be linked to information users by this referral service network. The network, by maintaining an inventory of all available STI sources and services, will direct a user, no matter where located in Canada, to the source or service most appropriate to his need. Thus, two distinct activities are required:

1. the enhancement of existing, and the development of new services as nodes in the network of STI Services by the various departments, agencies, and institutions of all governments, and the private sector, in the areas of their individual missions and expertise in response to demonstrated user needs; and

2. the implementation and operation of the referral service network with its necessary inventories, directories, etc., and personnel to use them, to assist information users to find the right node. (A simple analogy for this service is that of "animated yellow pages". It is a directory service, deeply indexed and classified, to let the client know how or where to get his enquiry answered. It is and will be the linking mechanism or "backbone" network for the national STI system. It will place no limits on the extent of logical or physical subnetworks that may be incorporated into the system.)

The NRC is now preparing to implement a pilot operation of this network. One office is to be established in one province. This is a co-operative federal/provincial project. It entails the partici-

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pation of 14 federal government departments and agencies, including the CONTROLLED participation of CENTRES OF EXPERTISE AND EXPERTS in addition to the provision of documentary and other printed information. It is anticipated that the equivalent kind of provincial resources will also be made available for this pilot operation.

The following objectives have been set for the pilot operation:

- to evolve a practical model of the Referral Service Network with field tested operating procedures and standards and the inventories and directories of STI Services and sources currently available,

- to develop procedures for determining the range and scale of the STI resources and services that will be required to meet the full demonstrable needs of users,

- to examine and project costs and evolve economic principles for the operation of the Canadian Network of STI Services and

- to develop the alliances that will be needed in all levels of government and between the government and private sectors.

- to provide communications between a client and the referral office at no cost to the client.

- the actual use of a selected, appropriate information service will be charged according to the usual fee of the service,

- the referral office will use computer data bases for directory and index services,

The findings and experience as well as the detailed systems design of this venture will be disclosed in future papers.

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VI Finally, the Sherriff

As you know, the pressures, both internally and internationally, are for governments to take command of the substance of information policy and perhaps even the sum of information services.

The Minister of the Crown to whom the National Research Council reports, spoke recently to a Conference on Mathematics in Canada. I have picked some excerpts (slightly altered) which I am certain apply also to the information business.

1. "In his recent book, The Best and the Brightest, David Halberstam describes Lyndon John Johnson's first Cabinet: Stunned by their glamour and intellect, he (Johnson) had rushed back to tell (Sam) Rayburn, his great and crafty mentor, about them, about how brilliant each was, that fellow Bundy from Harvard, Rusk from Rockefeller, McNamara from Ford. On he went, naming them all. "Well, Lyndon, you may be right and they may be every bit as intelligent as you say", said Rayburn, "but I'd feel a whole lot better about them if just one of them had run for sheriff once"."

2. "Thus we have at least these three strands: Information Systems as the artistic creation of imaginary worlds; Information Systems, as a mysterious supertool to be used by experts to save this world from the bungling bureaucrats and predatory politicians; and information as the intellectual trappings of boy-wonders who have never met a payroll, never run for sheriff, and shouldn't try to run the country. (In this last view, the sheriff, the great man, is independent of analysis, flying on judgement, hunch and the seat of his pants, because no information system can capture his problem.)"

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3. "Our community assigns the responsibility for taking decisions to a collection of action-oriented individuals, people who have run for sheriff - who spend their life running for sheriff - and who are actually aware, in a general manner, of where the country ought to go, but lack the detailed itinerary and the choice of means to go there."

4. "The point is that you must not assume that only the intellectual force of an argument matters in the process of policy formation. Optimizing models are one thing, but the structures of a bureaucracy and the processes of decision-making have dynamics of their own, and they are not irrelevant in taking decisions. The Rayburn view is a useful antidote to the claims for supertools as the saviours of the system."

5. "But don't tell me that it's all just a matter of getting the policy-maker to listen, or transplanting existing tools. The problems are hard, hard beyond your present ability to solve them, beyond your students' ability to handle them, beyond the power of your present tools even to phrase the important questions that must be posed. The task will take patience, infinite attention to the detail of institutional structures and the process of policy-making, and a willingness to live with inelegant, approximate, and ad-hoc solutions. It also requires a willingness to see your cherished proposals, product of laborious hours, rejected on the judgement of some "sheriff" who wouldn't know an optimum from an integral."

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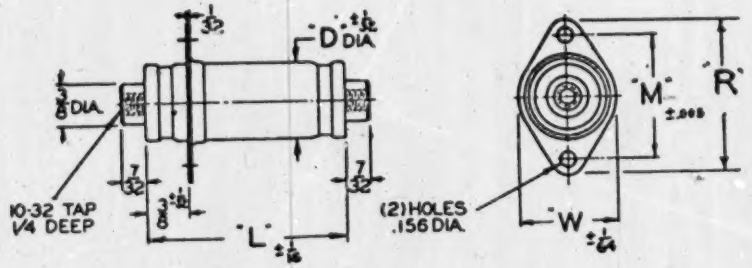

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Appendix A

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A canticle for Leibowitz. New York,
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Science fiction. 1959
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